

REMARKSAmendments

In the Request for Continued Examination dated November 10, 2010, it was intended to amend paragraph [0030]. Page 2 of that RCE did state "Please amend paragraph [0030] as follows:", but was then followed by a paragraph incorrectly labeled as "[0001]". This was in error. The text of that paragraph was, in fact, paragraph [0030], with the intended amendment (i.e. to insert an element number, i.e. element 13,13', to identify the conductive material layer). For the avoidance of doubt, the same amendment is presented in this Reply, with the correct paragraph numbering.

In the claims, claim 1 has been amended and now recites that the conductive contact part is formed with edges functioning as a spacer. Basis for this is found in paragraphs [0035] and [0059]. In addition, claim 3 has been amended to recite that the PTC material layer is retained between the conductive contact part and the conductive connect part by means of the spacer formed by the edges of the conductive contact part. These amendments have been made in the interest of rapid prosecution and without prejudice to Applicant's right to prosecute claims of similar or different scope to the unamended claims in one or more continuation applications.

The Rejection Under 35 USC § 103(a)

Applicant respectfully traverses the rejection of claims 1, 4-9, 15 and 17 under 35 USC § 103(a) as unpatentable over Bingo et al. (U.S. Patent No. 4,833,280) in view of Wang et al. (U.S. Patent No. 6,512,446).

As previously stated, the present claims are directed to a switch that includes a conductive movable member and at least first and second terminals. The switch is switchable by mechanically moving the movable member between a state in which the movable member contacts with the two terminals simultaneously and a state in which the movable member is apart from either one of the two terminals. At least one of the first and second terminals comprises a conductive contact part for contacting with the movable member, and that conductive contact part is formed with edges functioning as a spacer. In addition, at least one of the first and second terminals contains a conductive connect part for being electrically connected with an external element, and a PTC member located between the contact part and the connect part. As such, the switch provides overcurrent protection, as set out in paragraph [0023]. An important advantage

of the switch is that in one embodiment the switch is suited for being mounted directly on a printed circuit board (PCB) substrate so that the PCB substrate holds terminals of the switch in the correct positions to facilitate production of the switch (see paragraph [0023], lines 3-8). In one embodiment, by making the PTC member in the form of a layer which is positioned parallel to the substrate to which the terminals are fixed, conduction through the PTC member is over a relatively large area and over a relatively short thickness. By providing such a high area to thickness ratio, the resistance provided by the PTC element will be consequently low. A reduction in the overall resistance presented by the switch is advantageous (see paragraphs [0015] and [0023]). A further advantage of one embodiment is that a robust switch is provided. The tendency of parts to become detached from the PTC element is low and the PTC element can be held securely in place by being positioned between conductive material layers, e.g. metal foils, which are connected with contact and connect parts of a terminal which is fixed to the substrate (see paragraphs [0008] and [0014]). Furthermore, because the edges of the conductive contact part (2a in Figure 1(a)) function as a spacer, it is possible to decrease the amount of force applied on the PTC member 2b. This avoids negative effects due to compression on the PTC characteristic as set forth in paragraphs [0035] and [0059].

Bingo et al. discloses a slide switch in which a casing surrounds several fixed contacts and several terminals connected to the fixed contacts that extend to the outside of the casing. A slide member inside the casing has a movable contact portion that selectively connects a combination of the fixed contacts. Bingo teaches that a fixed contact (8a) is electrically connected to and may be integrally formed with a projecting terminal (9a) (column 6, lines 4-12). A movable contact (5) having a spring portion 23 is used to make an electrical connection between fixed contacts 8a and 8b. In another embodiment, a common central fixed contact 8c can be connected to a common terminal 9c and either terminal 9a or terminal 9b, thus allowing formation of a two-way switch (Figure 9, column 13, lines 13-39). As the Examiner acknowledges, there is no disclosure of a polymer PTC member located between the contact part and the connect part or that the PTC member should have conductive material layers comprising metal foils being located on opposite sides of the PTC material. Neither is there any teaching or suggestion that the edges of the conductive contact part could or should function as a spacer. In fact, if one views the fixed contact 8a as the "conductive contact part", one reading Bingo would be taught that it was necessary to have the fixed contacts be flat as shown in Figures 2 and 3, to provide good contact to the terminal 9a. Finally, there is no suggestion that the presence of a PTC member would be advantageous or needed for handling high current loads.

The deficiencies of Bingo are not resolved by the addition of Wang et al. Wang discloses an overcurrent protection apparatus in which a current-sensitive element exhibiting positive temperature coefficient (PTC) behavior is composed of a conductive polymer comprising at least one polymer, a conductive filler, and a non-conductive filler. The current-sensitive element (13) is sandwiched between two conductive electrodes (11,12), and each electrode is attached to a conductive metal foil (14,15). While the Examiner identifies elements 14 and 15 as the contact part and the connect part, respectively, one reading Wang would be taught that these metal foils are used to connect the current-sensitive element with the printed circuit board and the battery (see column 3, lines 16-19). They are essentially extensions of the conductive electrodes used to make an electrical connection. Furthermore, there is no suggestion that such a device would or should be used in connection with a moveable member.

As previously indicated, the Examiner has contended that it would be obvious to provide a PTC member located between the contact part and the connect part. Further, as indicated above, the Examiner equates the electrodes of Wang to the contact part and the connect part. Applicant believes that this contention is incorrect. Bingo teaches that the fixed contact and the projecting terminal may be an integral element, a situation that clearly would be defeated if a PTC member were to be “located between the contact part and the connect part” as is stated in the present claims, as such an arrangement would separate the fixed contact and the projecting terminal. In the Office Action, the Examiner has responded to this argument by saying that “[o]ne of ordinary skill in the art would understand that the PTC material will have to be located between the upper and lower part of the terminal, and as such the terminal will be made in two parts with PTC material sandwiched between the two parts”. Applicant believes that there is a distinct meaning to the concept of an integrally formed element, and since the element of Bingo is metal, it would not be possible to form an “integral” element with an “inserted” PTC component.

Applicants further contended in the RCE that since Bingo does not teach any need for handling high current conditions, there would be no motivation to add a PTC element to Bingo’s slide switch. In the Office Action, the Examiner disagreed, stating “[t]he chips do fail due to over current and heat generated by the overcurrent, and as such providing PTC to control the current would prevent the chip from prematurely failing”. It is not clear what is meant by “the chips”, since neither Bingo nor Wang refer to any chips or other electrical components. As a result, this rejection is unfounded.

Conclusion

It is believed that this application is now in condition for allowance and such action at an early date is earnestly requested. If, however, there are any outstanding issues which can be usefully discussed by telephone, the Examiner is asked to call the undersigned.

Respectfully submitted,

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